REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1, 4 and 33-38 are pending, with Claims 1 and 4 amended and Claims 1, 3-6, 8-11, 13-16, 18-22, 24-27 and 29-32 cancelled by the present amendment.

In the Official Action, Claims 1-10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ye et al. (U.S. Patent No. 6,414,788, hereinafter Ye) in view of Drake et al. (U.S. Patent No. 6,366,395, hereinafter Drake).

Claims 1 and 4 are amended to more clearly describe and distinctly claim Applicants' invention. Claims 33-38 are directed to an apparatus corresponding to the method recited in Claims 1 and 4. Support for these amendments is found in Applicants' originally filed specification.[1] No new matter is added.

Briefly recapitulating, amended Claim 1 is directed to an optical amplifying method of an optical amplifier connected to an optical transmission line. The method includes: detecting an optical input and output power of the optical amplifier; obtaining a difference between a measured gain of the optical amplifier and a target gain based on the detected optical input and output power to produce an error signal; applying the error signal to each of a proportional calculation and an integral calculation to create respective proportional and integral control signals, and adding proportional and integral control signals to create a drive current of at least one pump laser diode provided in the optical amplifier; controlling the gain of the optical amplifier with the drive current; and adjusting a control parameter of the proportional calculator in response to the detected optical input power. With the claimed invention, the gain of the optical amplifier is controlled in correspondence to the calculated LD circuit. Thus, the variation of the optical output power per wavelength channel is

[1] Specification Figure 6.

maintained small so as to suppress the degradation of transmission quality and to achieve equipment downsizing.[2]

Ye describes optical amplifiers that use a hypertransient control scheme. Optical taps may be used to tap the main fiber path through the amplifier before and after the gain stage. The gain stage may be provided by one or more rare earth doped fiber coils such as erbium-doped fiber coils. The coils may be pumped by laser diodes or other suitable pumps. The optical output power of the pumps may be controlled by a controller. The controller may calculate the appropriate power to be applied by the pumps based on the measured input and output signal powers of an amplifier. The control process implemented by the controller may be based on a combination of feedback and feed-forward control techniques.[3]

In step 80 of the process of Ye, the calculated feedback pump contribution and the calculated feed-forward pump contribution may be used to generate a desired value at which to drive the pump. A function that may be used is shown in equation 4 of Ye. As an example, the desired value may be calculated by linearly combining the calculated feedback pump contribution and the calculated feed-forward pump contribution. At step 82, the pump power calculated at step 80 may be adjusted to ensure that pump 56 operates within normal operating limits. At step 84, pump 56 may be driven at a calculated pump power level by supplying an appropriate drive signal to pump 56 using controller 52, digital to analog converter 72 and pump driver 74. By combining both feedback and feed-forward contributions when determining the level at which to drive the pump, drawbacks associated with using pure feedback and pure feed-forward approaches are avoided.[4] The calculated feedback pump contribution is based on a proportional integral derivative (PID) method, with parameters α, β and γ. Parameters α, β and γ are determined experimentally.[5]

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[2] Specification, page 4, lines 5-14.
[3] Ye, Abstract.
[4] Ye, column 6, line 63 through column 7, line 37.
[5] Ye, column 6, lines 52-63.

However, as noted during the interview, and contrary to the Official Action's assertion relative to now cancelled Claim 2, Ye does not disclose or suggest adjusting a control parameter of the proportional calculator in response to the detected optical input power. For a non-limiting example of Applicants' claimed control parameter adjustment, Applicants direct attention to gain adjusting circuit 19f shown in Applicants' originally filed Figure 6. In contrast, Ye discloses the control process implemented by the controller may be based on a combination of feedback and feed-forward control techniques. The feedback control technique of Ye cited in the Official Action is a PID (proportional-integral-derivative) control technique that includes fixed/***predetermined*** values proportional/integral parameters α, β and γ and does not include adjusting/adjustable parameters as recited in Applicants' now pending independent claims. Because the values of Ye are ***predetermined***, they are fixed and are not ***adjusted*** in real time as recited in Applicants' amended independent claims.

Drake describes an optical amplifier having a gain control capability. As a part of the background of Drake, Drake describes Figure 1 as an EDFA with an AGC. The AGC includes input power and output power measurement amplifiers 20 and 200. A comparison circuit 24 compares the input power and output power and calculates a correction signal for pumps P1 and P2.

Figure 5 of Drake describes an AGC control circuit with temperature correction. A measured input power is routed to a temperature compensation device 70. Input power measurements are also forwarded to a transient control device 80. Temperature monitor 72 provides a measured temperature signal to control device 70. Using the equation shown in column 4, lines 55-60, device 70 calculates a desired output power measurement. This output power measurement is fed to comparison circuit 24 and where the desired output power is compared to an actual output power creating an error signal which is fed to a proportional/integral control device 78. However, like Ye, Drake does not disclose or

suggest Applicants' claimed adjusting a control parameter of the proportional calculator in response to the detected optical input power.

MPEP §706.02(j) notes that to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Also, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck,* 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Without addressing the first two prongs of the test of obviousness, Applicants submit that the Official Action does not present a *prima facie* case of obviousness because both Drake and Ye fail to disclose all the features of Applicants' claimed invention.

Accordingly, in view of the present amendment and in light of the previous discussion, Applicants respectfully submit that the present application is in condition for allowance and respectfully request an early and favorable action to that effect.

Respectfully submitted,

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